Alternative Maritime Power at the Port of Los Angeles

POLA Marketing – November 9, 2004

AMP Agenda

- Container Vessel On Board Electrical Power Systems
- Shore to Ship Power Transfer Methods
- Cost Comparison

Container Ship Particulars
On-Board Electrical Systems

- Approx. 10% of current vessels are 6.6 k.v.
- Balance are 440V vessels. 440V Vessels require a 6.6/440 transformer.
- Vessel power demand widely variable 1 – 10 MW (Average 4MW)

Container Ship Particulars
On-Board Electrical Systems

Power Demand Examples

- 2 Megawatt at 6.6 k.v. = 1 cables
- 2 Megawatt at 440 V = 9 cables

Container Ship Particulars

Shore to Ship Power Transfer

- Barge Based Power Transfer System
- Transformer/Cable Container Power Transfer System
- Ship Based Cable & Power Transfer System

Shore to Ship Power

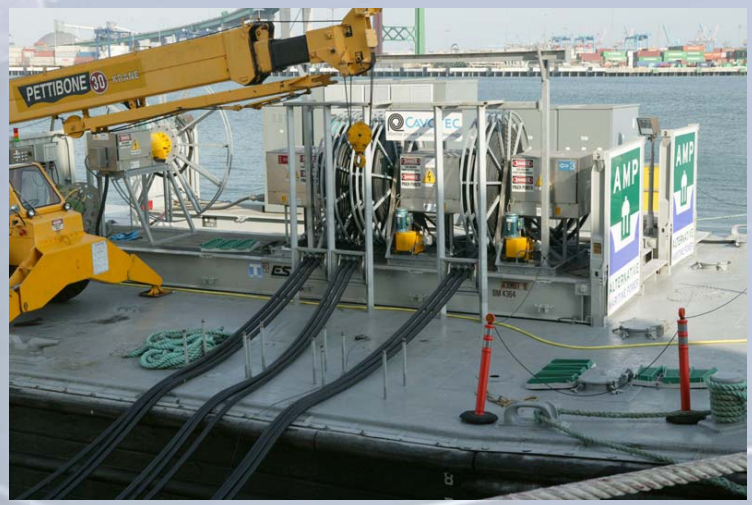
Barge Power Transfer

Shore to Ship Power

Container Ship Equipment

Shore to Ship Power

Barge Power Transfer



POLA Marketing – November 9, 2004

Shore to Ship Power

Barge Power Transfer

Shore to Ship Power

Barge Power Transfer

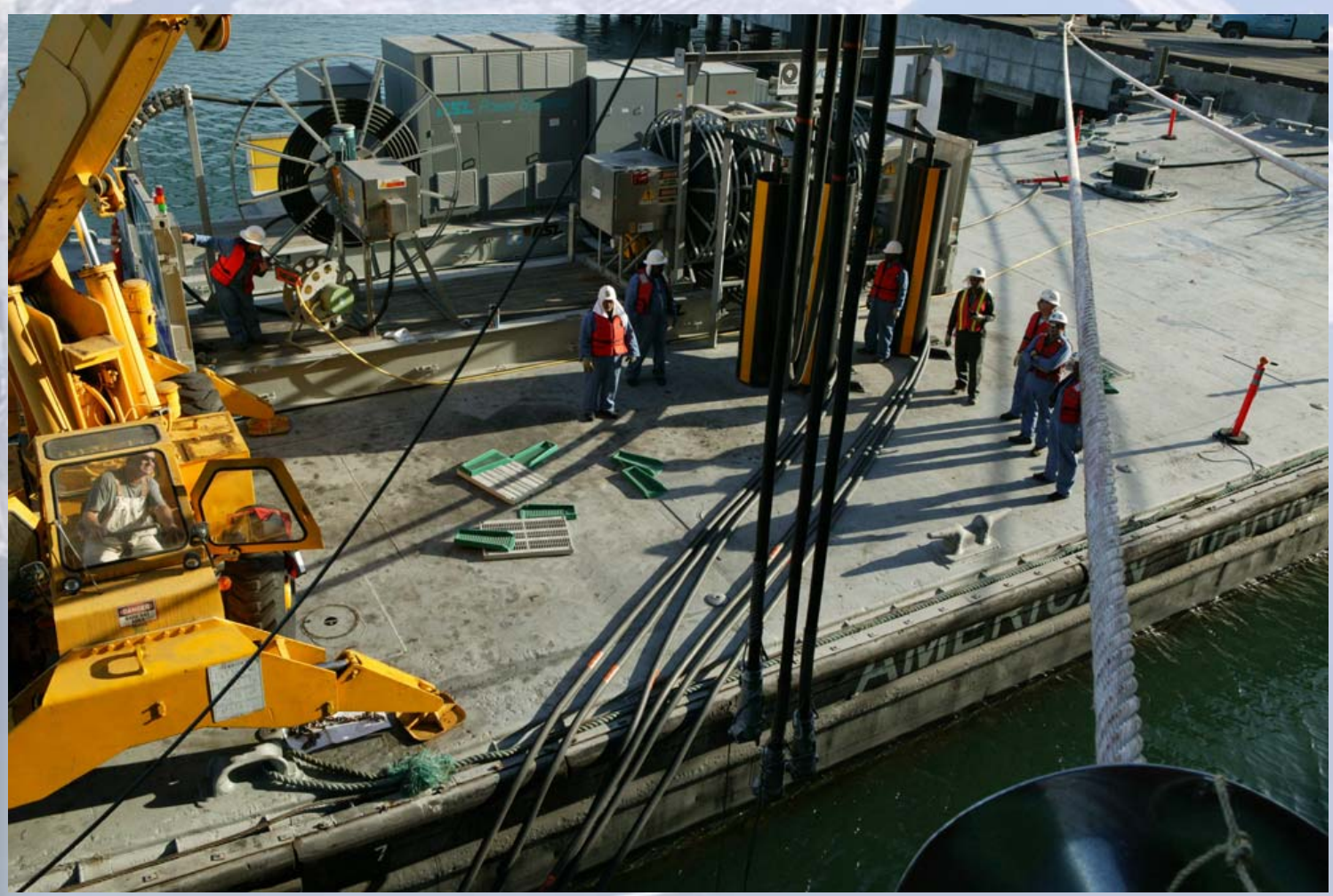
Shore to Ship Power

Barge Power Transfer

POLA Marketing – November 9, 2004

Shore to Ship Power

Barge Power Transfer



POLA Marketing – November 9, 2004

Shore to Ship Power

Barge Power Transfer

POLA Marketing – November 9, 2004

Shore to Ship Power

Barge Power Transfer

POLA Marketing – November 9, 2004

Shore to Ship Power

Barge Power Transfer

Shore to Ship Power

Barge Power Transfer

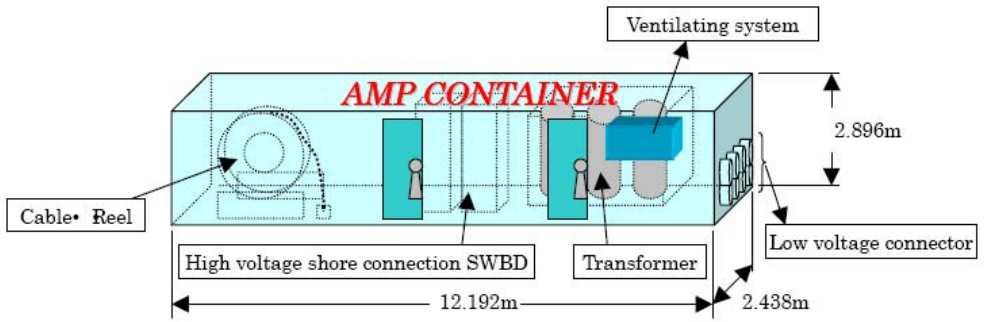
Shore to Ship Power

Transformer Container Power Transfer System

POLA Marketing – November 9, 2004

Shore to Ship Power

Transformer Container Power Transfer System



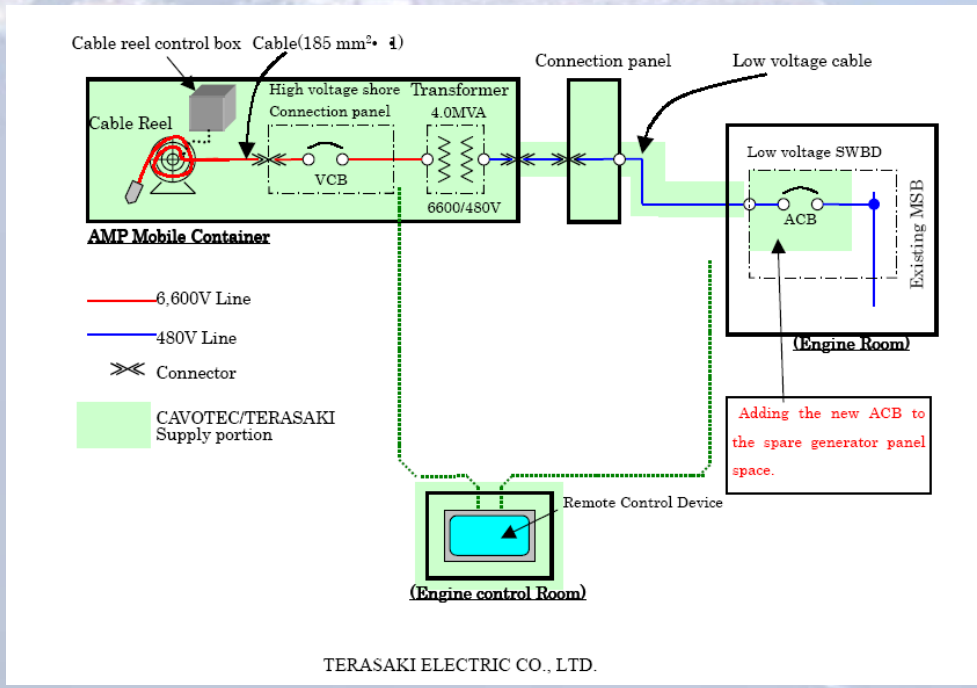
(*)**Ventilating system**

Setting temperature• 25• • Adjustable• •

• • Source• • AC100V• 60Hz

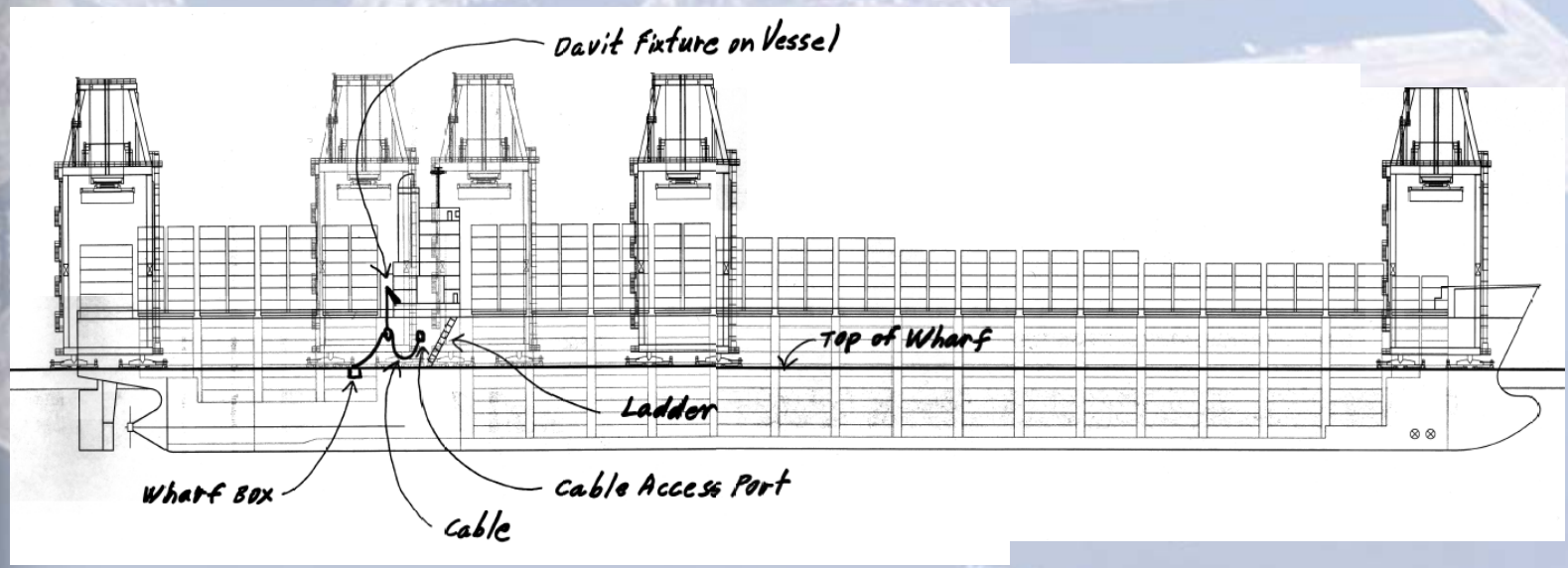
Shore to Ship Power

Transformer Container Power Transfer System



Shore to Ship Power

Ship Based Power Transfer System



MV NYK Atlas first Arrival

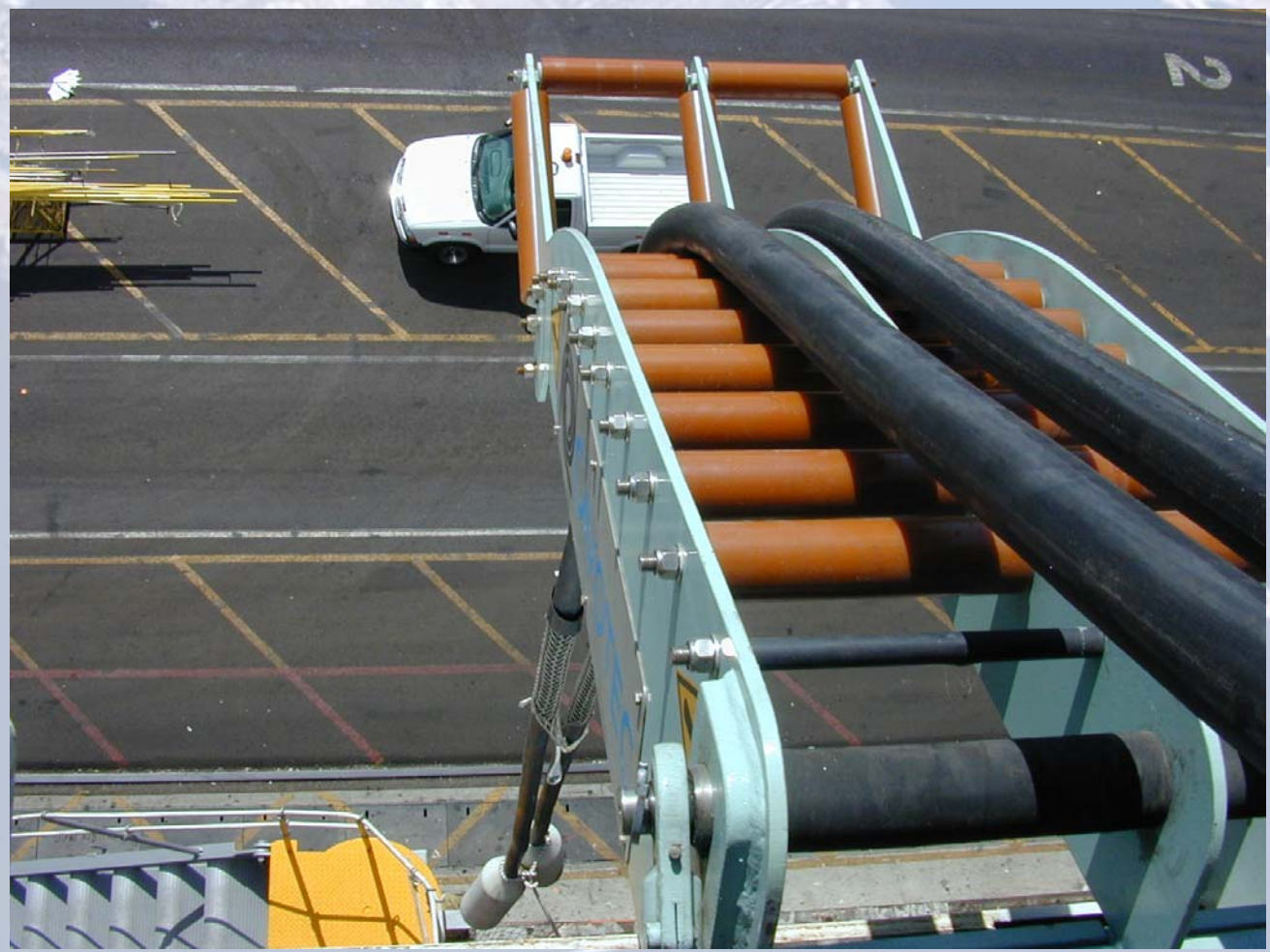
Shore to Ship Power

Ship Based Power Transfer System

POLA Marketing – November 9, 2004

Shore to Ship Power

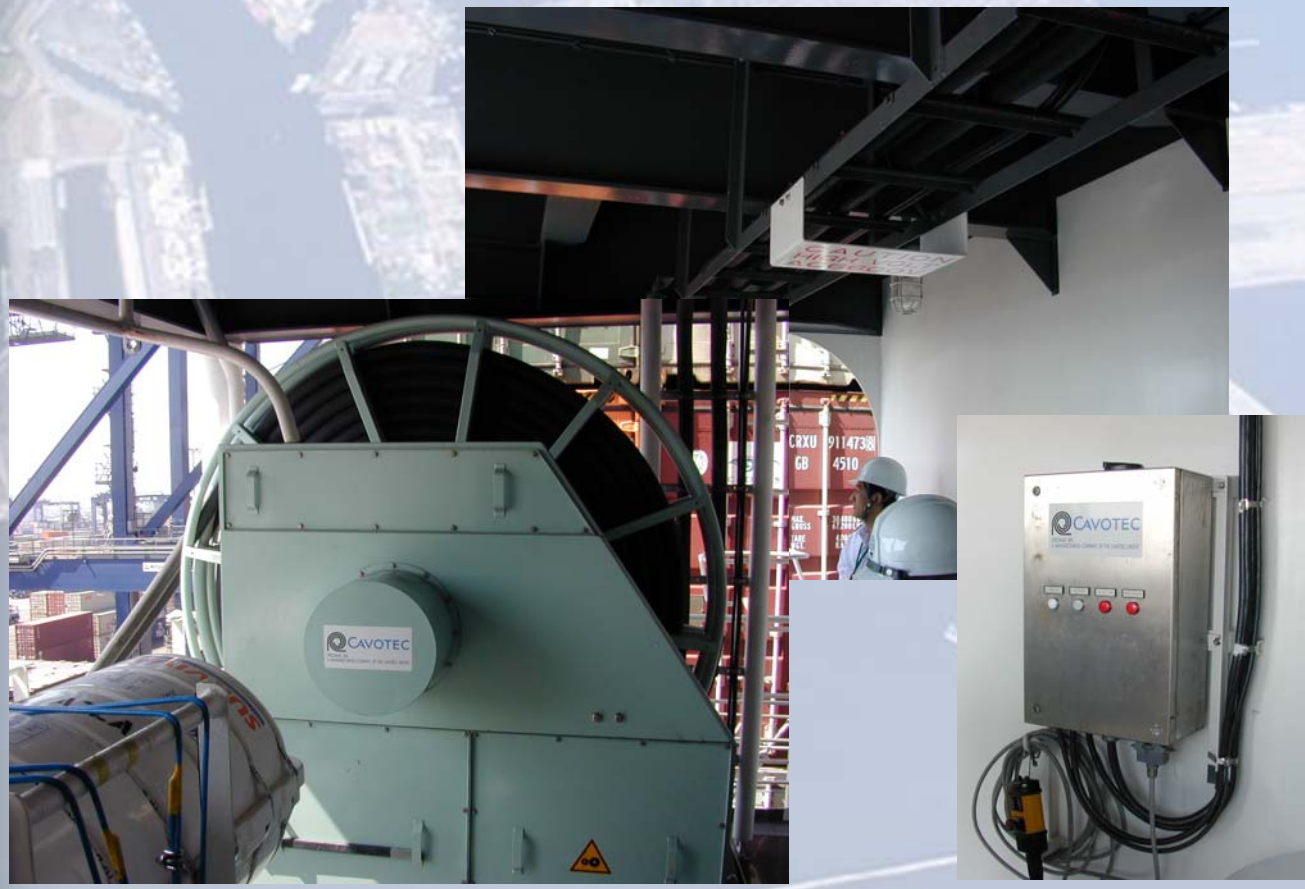
Ship Based Power Transfer System



POLA Marketing – November 9, 2004

Shore to Ship Power

Ship Based Power Transfer System



AMP Container Ship Outfitting Cost

- China Shipping (440 volt): $320,000
- NYK (6.6 kV) : $830,000
- APL (440 volt) : $1,800,000

Thank You.